

REMARKS

Claims 1, 3, 4, 6 through 10, 12 through 19 and 21 through 23 are pending in the application.

Claim 1 has been amended to emphasize advantageous inventive food casings that include copolyesters. Support for this amendment can be found in the Application-as-filed, for example on Page 6, lines 4 through 12.

Claim 1 has been further amended to emphasize advantageous inventive food casings that include water-soluble polymer. Support for this amendment can be found in the Application-as-filed, for example on Page 6, lines 4 through 6.

Claim 1 has also been amended to emphasize advantageous embodiments in which the recited water vapor permeability is essentially determined by the synthetic polymers. Support for this amendment can be found in the Application-as-filed, for example on Page 7, lines 4 through 5.

Claim 1 has additionally been amended to conform grammatically with the foregoing amendments. Support for this amendment can be found in the Application-as-filed,

Claim 15 has been amended to reflect advantageous embodiments in which the intrinsic stability is promoted by an adhesion-promoting treatment or impregnation consisting of one or more of oil or water, and the food casing has optionally been corona-treated. Support for this amendment can be found in the Application-as-filed, for example on Page 4, lines 18 through 22.

Claim 23 has been amended advantageous embodiments in which the synthetic polymer consists of a mixture of aliphatic copolyamide; polyether block amide and a water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified

polyvinylacetate. Support for this amendment can be found in the Application-as-filed, for example on Page 5, line 30 through Page 6, line 6 in conjunction with Page 8, lines 5 through 17.

Reexamination and reconsideration of this application, withdrawal of all rejections, and formal notification of the allowability of the pending claims are earnestly solicited in light of the remarks which follow.

*The Claimed Invention is Patentable
in Light of the Art of Record*

Claims 1, 3, 4, 6 through 10, 12 through 19 and 21 through 23 stand rejected in light of United States Patent No. 7,001,635 ("US 635") to Merritt et al. in view of United States Patent No. 6,203,750 ("US 750") to Ahlgren et al. and United States Published Patent Application No. 2004/0062834 ("US 834") to Cruz.

It may be useful to briefly consider the invention before addressing the merits of the rejection.

Food casings, especially sausage casings, are predominantly offered in shirred form. Cellulose-based shirred casings, such as those disclosed in US 635, are known. Shirred sticks formed from synthetic polymers are also known; however, such shirred sticks are generally not very stable without net-type or reinforcing packaging, and are thus not in widespread use. For example, heretofore known synthetic polymer-based casings exhibit a relatively high resilience, resulting in the re-expansion of the shirred stick and associated pleat loss. (In that regard, the Examiner's attention is kindly directed to the Application-as-filed on Page 2, lines 1 through 14, as well as US 834, Para. 0016, fifth sentence). Coatings incorporating a binder, such as a cellulosic binder, may be used to impart shirred stick stability. The coating binder must not overly adhere the pleats together; however, as the shirred stick must readily expand during subsequent stuffing.

In addition to shirred pleat stability, polymer-based food casings should advantageously provide a balance of additional properties, including only modest bending of the shirred tube (thereby avoiding the conventional external reinforcement) and acceptable water vapor permeability.

Unexpectedly, Applicants have found synthetic polymeric food casings that impart a heretofore unknown balance of beneficial properties, including shirred stick stability, advantageous tensile properties and water vapor permeability.

Applicants have more particularly found that food casing consisting essentially of synthetic polymers comprising "soft" polymers selected from aliphatic polyamides and copolyamides, polyether block amides, polyurethanes and biodegradable polyesters, along with water-soluble polymer, bends under the effect of its own weight by no more than 20 % and exhibits a water vapor permeability of 20 to 1000 g/m² d, as recited in the claims as-amended.

In particularly expedient embodiments, the food casing water vapor permeability is imparted by the synthetic polymers, as further reflected in the claims as-amended

Applicants respectfully reiterate that the inventive food casings may further advantageously be compressed to a ratio of 100:1 or more, as additionally recited in the claimed invention. In contrast, conventional casings, such as cellulose-based casings, are typically shirred at much lower compression ratios, such as a 70:1 ratio. In that regard, the Examiner's attention is kindly directed to the Application-as-filed on Page 8, lines 28 through 31. The elevated inventive compression ratios result in a higher number of casings per shirred stick, reducing operating costs for both the casing manufacturer and the downstream sausage producer.

In expedient embodiments, intrinsic stability may be imparted by a temporary setting of the shirring geometry, resulting in a breakdown in tension of the shirred pleats, with the intrinsic stability further promoted by an adhesion-promoting treatment or impregnation consisting of one or more of oil or water, along with optional corona-treatment, as recited in Claim 15 as-amended.

In particularly advantageous embodiments, the inventive food casings are single-layered as recited in Claim 6.

In additional advantageous aspects, the inventive intrinsically stable shirred food casings are formed from synthetic polymer consisting of a mixture of aliphatic copolyamide; polyether block amide and a water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified polyvinylacetate., as recited in Claim 23 as-amended.

The cited references do not teach or suggest the claimed invention.

Applicants respectfully reiterate that US 635 is generally directed to cellulosic casings containing liquid smoke that provide an enhanced smoky color and flavor to foods via an alkaline treatment. (Col. 1, lines 6 through 10 and Col. 6, lines 9 through 24). US 635 merely generically notes that casings formed from polymeric materials may be used within its invention. (Col. 6, lines 55 – 57). US 635 applies the liquid smoke prior to or during shirring. (Col. 8, lines 27 – 34). In contrast to the inventive intrinsically stable shirred casings, US 635 further expressly teaches that its casings are treated on the inside with a shirring solution to form self-sustaining sticks that “have sufficient coherency to hold together immediately after shirring through shipping and ultimate use.” (Col. 7, lines 10 – 12 and Col. 8, line 67 – Col. 9, line 5). The shirring solution used to form the working examples of US 635 incorporates carboxymethyl cellulose. (Col. 11, lines 24 – 43).

US 635, directed to cellulosic casings and merely generically referencing polymeric casings, does not teach or suggest the recited food casing consisting essentially of synthetic polymers comprising aliphatic polyamides and copolyamides, polyether block amides, polyurethanes, biodegradable polyesters or mixtures thereof, much less such casings further including a water soluble polymer, as recited in the claims as-amended.

Nor US 635 teach or suggest that such food casings would exhibit a water vapor permeability of 20 to 1000 g/m² and that the permeability of the casing is essentially determined by the synthetic polymers, as recited in the claims as-amended.

And US 635, solely directed to liquid smoke transporting casings, can not teach or suggest such food casings compressed in a ratio of 100:1 or more, as further recited in the claimed invention. Applicants respectfully reiterate that US 635 applies liquid smoke prior to or during shirring, and therefore the compression ration can not be greater than 100 because the liquid smoke intended for transport into the food would have been removed, e.g. squeezed, from the casing prior to stuffing. Applicants respectfully reiterate that to modify US 635 so as to incorporate such an elevated compression ratio would render US 635 unfit for its intended purpose as a smoke-transport casing.

US 635, expressly teaching an cellulosic shirring solution to provide self-sustaining sticks, also fails to teach or suggest the recited intrinsically stable shirred casings. The Examiner is correct in the assertion on Page 3, first partial paragraph of the outstanding Office Action that US 635 incorporates a coating to provide self-sustaining properties and further on Page 3, last partial paragraph that US 635 emphasizes the importance of coherence. Applicants respectfully reiterate, however, that US 635 expressly teaches the use of shirring coatings, particularly cellulosic shirring coatings, to impart coherency. Applicants further respectfully make of record that shirring solutions containing cellulose are known in the art to adhere shirred casing pleats together upon drying, as evidenced within US 834 (US 834, Paragraphs 0033 and 0035, discussed below).

US 635 thus can not teach or suggest advantageous shirred food casings achieving the required intrinsic stability by a temporary setting of the shirring geometry and the resultant breakdown in tension of the shirred pleats, in which the intrinsic stability is promoted by an adhesion-promoting treatment or impregnation consisting of one or more of oil or water, and the food casing has optionally been corona-treated, as recited in Claim 15 as-amended. US 635 instead expressly teaches cellulosic shirring solutions to impart shirred stick stability.

US 635 likewise fails to teach or suggest that advantageous food casings further comprising at least one of (i) an outer coating of oil or water and (ii) an outer surface tension of 40 to 50 mN/m imparted by corona treatment would result in shirred casings extending in the longitudinal direction by no more than 10 %, as recited in Claim 22.

US 635, generically noting “plastics,” also fails to teach or suggest advantageous inventive food casings formed from synthetic polymers consisting of a mixture of a single copolyamide and polyether block amide; much less such food casings further including a water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified polyvinylacetate, as recited in Claim 23 as-amended.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 635, considered either alone or in combination with the remaining art of record.

US 750 is directed to multilayered heat shrinkable casings suitable for cook-in use. (Col. 2, lines 5 – 7). The films of US 750 include a layer having a mixture of at least two polyamides having differing crystalline structure, which is said to allow orientation of the layer with hot water or steam. (Col. 2, lines 17 – 29; Col. 5, lines 1 – 5, and Col. 16, lines 10 - 18). The films of US 750 further include polyolefin layer(s). (Col. 2, lines 8 – 11). In fact, the films of US 750 can incorporate up to 7 layers, including a polyvinylidene chloride barrier layer. (Col. 4, lines 44 – 45). The multilayered films of US 750 may be partially or completely crosslinked. (Col. 3, lines 46 – 51). US 750 notes compression ratios of 40:1 as acceptable, noting that the compression ratio may be “even greater.” (Col. 14, lines 58 – 63). US 750 generically notes that various of its working examples were “shirred.” (Col. 19, lines 46 – 47 and Col. 20, lines 20 – 21).

US 750, directed to particular copolyamide blends, does not teach or suggest the recited food casing consisting essentially of synthetic polymers comprising aliphatic polyamides and copolyamides, polyether block amides, polyurethanes, biodegradable polyesters or mixtures thereof that further include a water soluble polymer, as recited in the claims as-amended.

Nor does US 750 teach or suggest that such food casings would exhibit a water vapor permeability of 20 to 1000 g/m².

And US 750, noting compression ratios as low as 40:1 as acceptable, can not teach or suggest such food casings compressed in a ratio of 100:1 or more, as further recited in the claimed invention.

US 750, merely generically noting that its films may be shirred, also fails to teach or suggest the recited intrinsically stable shirred casings.

US 750 thus can not teach or suggest advantageous shirred food casings achieving the required intrinsic stability by a temporary setting of the shirring geometry and the resultant breakdown in tension of the shirred pleats, in which the intrinsic stability is promoted by an adhesion-promoting treatment or impregnation consisting of one or more of oil or water, and the food casing has optionally been corona-treated, as recited in Claim 15 as-amended. As noted above, US 750 instead merely generically notes that several of its working examples were "shirred."

US 750, requiring a multi-layered casing, similarly can not teach or suggest the inventive single-layered food casings of Claim 6.

US 750 likewise fails to teach or suggest that advantageous food casings further comprising at least one of (i) an outer coating of oil or water and (ii) an outer surface tension of 40 to 50 mN/m imparted by corona treatment would result in shirred casings extending in the longitudinal direction by no more than 10 %, as recited in Claim 22.

Nor does US 750, requiring first and second polyamides, teach or suggest advantageous inventive food casings formed from synthetic polymers consisting of a mixture of a single copolyamide and polyether block amide; much less such food casings further including a water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified

polyvinylacetate, as recited in Claim 23.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 750, considered either alone or in combination with the remaining art of record.

US 834 does not cure the deficiencies in the foregoing references.

US 834 is generally directed to chorizo casings incorporating a silicon-based barrier control agent that provides improved permeability. [Para. 0017]. The silicon barrier control agent has a polyhedral geometry, and is preferably a polyhedral oligomeric silsesquioxane [Para. 0023]. US 834 expressly teaches tailoring the permeability of its casings via silicon-based barrier control agent constitution or amount. [Para. 0027, Para. 0028 and Para. 0030]. US 834 generically notes that its casings are thinner than conventional casings, thereby allowing the production of shirred sticks containing “more casings” per stick. [0031].

Evidencing conventional wisdom, US 834 teaches that casings formed from conventional polyamide blends suffer from “un-shirring” prior to stuffing. US 834 goes on to note that for those and “other reasons” polyamide casings “are not used today.” [Para. 0016]. US 834 expressly teaches application of a cellulosic coating to impart casing stability. [Paras. 0033 - 0036]. In fact, US 834 particularly notes that “this coating ... provides a shirred stick that is ... sufficiently rigid for transportation ... and provides sufficient resistance to premature unshirring.” [Para. 0035].

Applicants respectfully reiterate that US 834, requiring a silicon-based barrier agent in its casing polymer, does not teach or suggest the recited food casing consisting essentially of synthetic polymers.

US 834, directed solely to polyamide casings, further does not teach or suggest the recited food casings including polyether block amides, polyurethanes, biodegradable polyesters or mixtures thereof, much less such casings further incorporating a water soluble polymer, as recited in the claims as-amended.

Nor US 834 teach or suggest that such food casings would exhibit a water vapor permeability of 20 to 1000 g/m² and that the permeability of the casing is essentially determined by the synthetic polymers, as recited in the claims as-amended. US 834, requiring a silicon barrier agent to provide permeability, instead strongly teaches away from the recited casings.

And US 834, generically noting “more casings per stick”, can not teach or suggest such food casings compressed in a ratio of 100:1 or more, as further recited in the claimed invention.

US 834, similarly teaching a cellulosic shirring solution to provide self-sustaining sticks, also fails to teach or suggest the recited intrinsically stable shirred casings.

US 834 thus can not teach or suggest advantageous shirred food casings achieving the required intrinsic stability by a temporary setting of the shirring geometry and the resultant breakdown in tension of the shirred pleats, in which the intrinsic stability is promoted by an adhesion-promoting treatment or impregnation consisting of one or more of oil or water, and the food casing has optionally been corona-treated, as recited in Claim 15 as-amended. As noted above, US 834 instead expressly teaches cellulosic shirring solutions to impart shirred stick stability.

US 834 likewise fails to teach or suggest that advantageous food casings further comprising at least one of (i) an outer coating of oil or water and (ii) an outer surface tension of 40 to 50 mN/m imparted by corona treatment would result in shirred casings extending in the longitudinal direction by no more than 10 %, as recited in Claim 22.

Nor does US 834, solely directed to polyamides, teach or suggest intrinsically stable shirred food casings that further include polyether block amide and a water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified polyvinylacetate, as recited in Claim 23.

Accordingly, Applicants respectfully submit that the claimed invention is likewise patentable in light of US 834, considered either alone or in combination with the remaining art of record.

There would have been no motivation to have combined the cited references. US 635 is directed to alkaline treatments for liquid-smoke-transfer casings. US 750 is directed to films formed from a mixture of polyamides that may be oriented using hot water or steam. US 834 is directed to casings incorporating a particular silicon-based barrier control agent. These are altogether different issues, to say the least.

However, even if Applicants had combined US 635, US 750 and US 834 (which they did not) the present invention would not have resulted.

Applicants take this opportunity to respectfully submit that the outstanding Office Action's urgings on Page 4, last full paragraph regarding the combination of the "compression ratio" of US 750 and "self-sustaining shirred sticks" of US 771 is conjecture. Applicants similarly respectfully submit that the outstanding Office Action's urgings on Page 6, second full paragraph regarding the combination of the "stability" of US 750 with the "permeability" of US 834 and the "shirring" of US 635 is likewise conjecture.

US 750 indicates that compression ratios as low as 40:1 as acceptable. Furthermore, as noted above, the smoked casings of US 635 can not be sheared at high compression ratios. In contrast to the recited intrinsically stable casings, US 771 and US 834 both teach cellulosic coatings imparting shirred stability. US 834 further requires a silicon-based barrier control agent to impart permeability.

Consequently, the combination urged within the Office Action would, at best, result in a casing formed from either cellulose or a combination of two polyamides that further includes a silicon-based barrier control agent and has a cellulosic shirring-stabilizing coating and moderate compression ratio.

Thus the combination of the cited references simply does not teach or suggest the recited food casings consisting essentially of synthetic polymers comprising aliphatic polyamides and copolyamides, polyether block amides, polyurethanes, and/or biodegradable polyesters that further include water-soluble polymer, much less that such casings would bend under the effect of its own weight by no more than 20 % and exhibit a water vapor permeability of 20 to 1000 g/m² d.

And the combination most certainly does not teach or suggest such food casings in which the water vapor permeability is essentially determined by the synthetic polymers. US 834 clearly requires a silicon-based barrier control agent to control permeability.

Nor does the combination teach or suggest the claimed intrinsically stable shirred casings. Both US 750 and US 834 expressly teach cellulosic coatings to impart shirring stability.

And the combination can not teach or suggest such food casings compressed in a ratio of 100:1 or more, as further recited in the claims as-amended. Applicants respectfully reiterate that to modify US 635 so as to incorporate such an elevated compression ratio would render US 635 unfit for its intended purpose as a smoke-transport casing. US 750 indicates a compression ratio of 40:1 as acceptable.

The combination also does not teach or suggest that advantageous food casings further comprising at least one of (i) an outer coating of oil or water and (ii) an outer surface tension of 40 to 50 mN/m imparted by corona treatment would result in shirred casings extending in the longitudinal direction by no more than 10 %, as recited in Claim 22.

Nor does the combination teach or suggest advantageous inventive food casings formed from synthetic polymers consisting of a mixture of a single copolyamide and polyether block amide; much less such food casings further including a water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified water-soluble polymer selected from polyvinylpyrrolidone or partially or completely saponified polyvinylacetate, as recited in Claim 23. US 635 generically teaches "plastics." US 834 is solely directed to polyamide-based casings. US 750 expressly requires first and second polyamides.

Accordingly, the cited references fail to teach or suggest the claimed invention, considered either alone or in any combination.

CONCLUSION

It is respectfully submitted that Applicants have made a significant and important contribution to the art, which is neither disclosed nor suggested in the art. It is believed that all of pending Claims 1, 3, 4, 6 through 10, 12 through 19, and 21 through 23 are now in condition for immediate allowance. It is requested that the Examiner telephone the undersigned if any questions remain to expedite examination of this application.

It is not believed that extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time and/or fees are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required is hereby authorized to be charged to Deposit Account No. 50-2193.

Respectfully submitted,



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